Jetstream-31 (J31) Flight Report for INTEX-ITCT
Flight 16 - 29 July 2004

Profiles and near-surface legs with Ron Brown and two sondes it released. Near surface during Terra 1537 UT overpass in MISR Local Mode box. Profiling downward during Aqua 1718 UT overpass.

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Overview

This was the tenth J31 flight out of Pease, on the least cloudy day since our arrival at Pease. Goals focused on the MISR Local Mode box of the Terra 1537 UT overpass, on the Aqua 1718 overpass, and on comparisons to the Ron Brown AODs, lidar profiles, and sonde profiles.

J31 and its instruments performed well.

Flight Path, Timing, and Measurements

Flight path is shown in Figure 1 below. Engines on ~953 EDT (1353 UT) Takeoff at 1422 UT. Climbed to ~6.4 km, looking for cirrus-free area. We saw many dark aerosol layers on the horizon, often over tops of cumulus clouds (see Figure 2 below). Profiled down to ship, with AOD(500 nm) increasing from ~0.04 at max altitude to ~0.88 at ~60 m near the ship (see Figure 3 below).

Ship released a sonde at 1527 UT, with J31 nearby at ~60 m.

We flew several legs at ~60 m near the ship, ~1515-1620 UT and documented an AOD gradient that persisted in both directions (see Figure 2 below). Profiled up to 23 kft (7317 m), ~1621-1650 UT. AOD(500 nm) decreased from ~0.51 to 0.028.

Profiled down to near ship, ~1650-1726 UT. This included Aqua overpass at 1718 UT.

Ship released second sonde at 1734 UT. We profiled up to ~2000 m while heading home.

Landed at ~1745 UT.

SSFR data are shown in Figure 4 below.

Debrief

Changing plans when above 17,500 ft takes ~ 10 minutes to get permission, so we need to anticipate changes and give the pilots adequate warning. When searching for clear areas, it may be best to climb only to 17,500 ft and get a scientist in the cockpit to survey the situation.

POS: Accuracies varied from ~0.5 to ~ 6 m, and the red position light came on several times, as usual. Message log was not saved, due to operator error.

Nav/Met: OK.

SSFR: Operated well. Some broken cirrus.

AATS: Performed well, after needing several bootings on the runway to get cold detector temperature control.

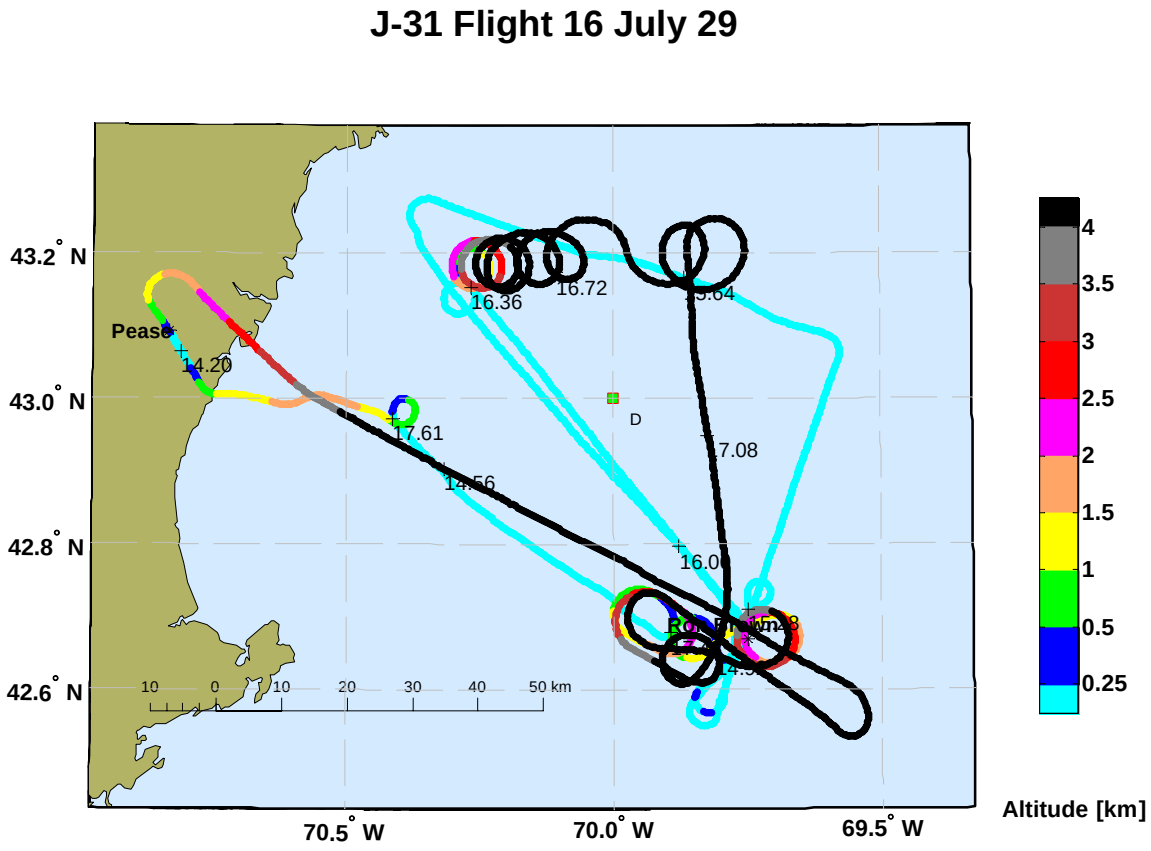

Figure 1. Flight track of J-31, Flight 16, 29 July 2004.

Figure 2. An example of multiple dark aerosol layers above cumulus cloud tops on J31 Flight 16. Photo courtesy of Allen Chu.

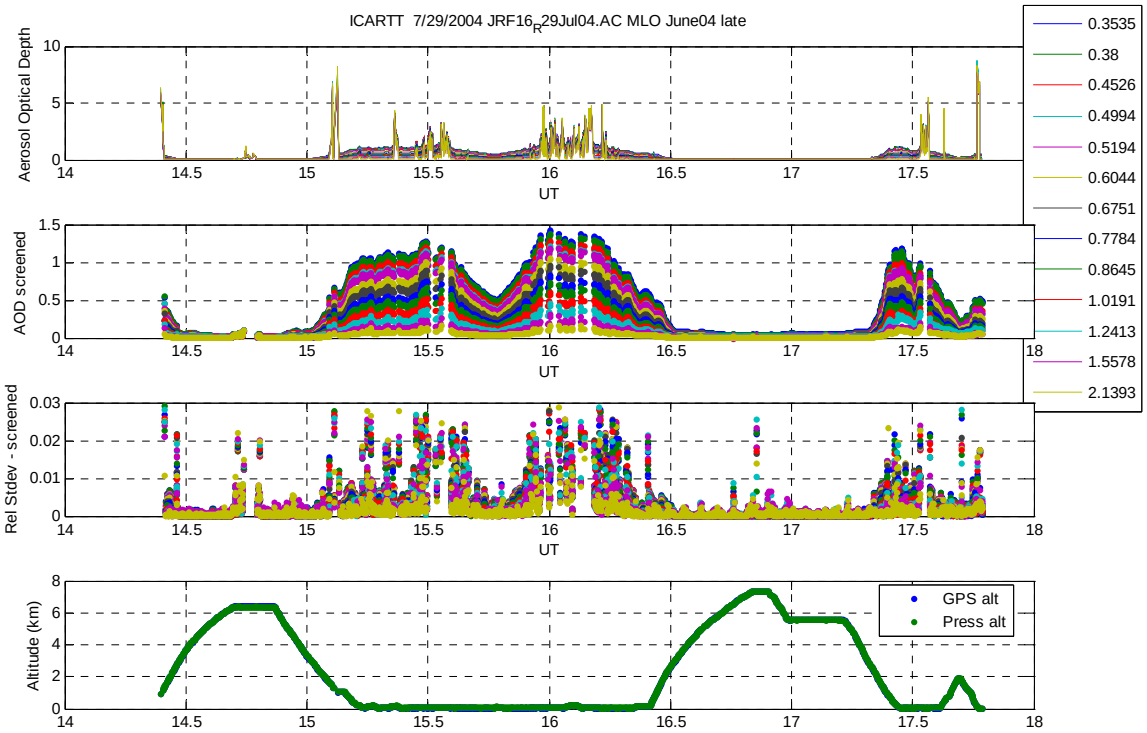

Figure 3. Time series of AATS-14 data for J-31 Flight 16, July 29, 2004.

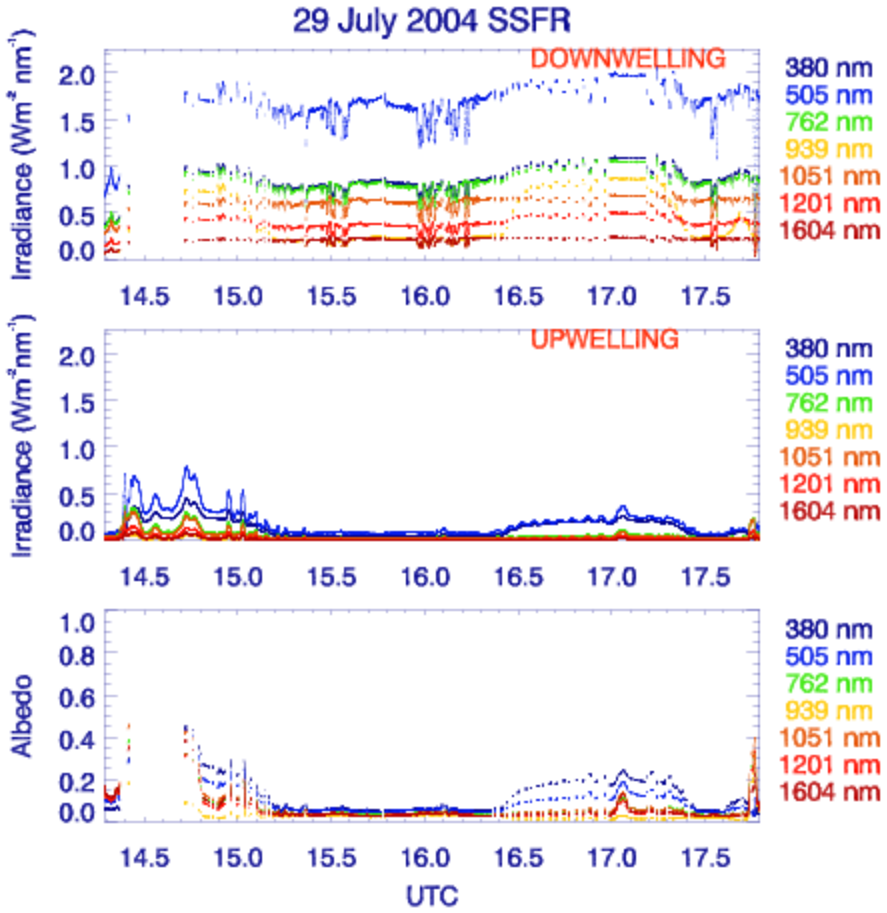

Figure 4. Time series of SSFR-measured downwelling and upwelling irradiance and albedo for J31 Flight 16, July 29, 2004. The downwelling (and albedo) has been filtered to remove data when the aircraft attitude deviated by more than 3% from level. The speckled pattern in the downwelling and albedo time series is caused by the J31 spiral ascents and descents, in which J31 usually deviates by more than 3% from level.